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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,207	09/18/2003	Gregory C. Burnett	ALPHP010X	7159

98195 7590 08/30/2010

Gregory & Martensen LLP
2018 Bissonnet Street
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EXAMINER	
LAO, LUN S	
ART UNIT	PAPER NUMBER
2614	
MAIL DATE	DELIVERY MODE
08/30/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/667,207	BURNETT ET AL.	
	Examiner	Art Unit	
	LUN-SEE LAO	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6,8-11,26,28-32,35,37,38,45,47 and 49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6,8-11,26,28-32,35,37,38,45,47 and 49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. This communication is responsive to the remarks filed on 06-24-2010.

Claims 4, 5, 7, 12-25, 27, 33, 34, 36, 39-44, 46 and 48 have been canceled. Claims 1-3, 6, 8-11, 26, 28-32, 35, 37, 38, 45, 47 and 49 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 6, 8-11, 26, 28-30, 32, 35, 37, 38 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverberg et al (US PAT.5,406,622) in view of Holzrichter (US PAT. 5,729,694) and Hosoi (US PAT. 5,754,665).

Consider claim 1 Silverberg teaches a method for removing noise from acoustic signals, comprising:

receiving at least two acoustic signals using at least two acoustic microphones (see fig.1 (10, 11)) positioned in a plurality of locations;

generating a voice activity detection (VAD) signal using the voice activity signal; generating at least two transfer functions representative of a ratio of energy of the acoustic signal received using at least two different acoustic microphones(10,11) of the at least two acoustic microphones when the VAD indicates that user voicing activity is

absent(17,18); and removing acoustic noise from at least one of the acoustic signals by applying at least one of the at least two transfer function to the acoustic signals and generating denoised acoustic signals (see figs 1-2 and col. 2 line 15-col. 3 line 68); but Silverberg does not explicitly teach receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user; and the at least two transfer functions comprise a first transfer function and a second transfer function; and removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals..

However, Holzrichter teaches receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user(see fig. 5 (43) and see col. 15 line 29-col. 16 line 3 and col. 60 line 19-30); and the at least two transfer functions comprise a first transfer function (see fig. 5(57)) and a second transfer function (56); and removing acoustic noise from at least one of the acoustic signals by applying the first transfer function (57) and at least one combination (58) of the first transfer function (57) and the second transfer function (56) to the acoustic signals and generating denoised acoustic signals (59) (see col. 15 line 29-col. 16 line 3).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Holizrichter into Silverberg to produce more accurate speech coding.

On the other hand, Hosoi teaches that the at least two transfer functions comprise a first transfer function (picks up a noise transfer function(not shown) by microphone in fig.3 (2)) and a second transfer function (picks up another speech transfer function(not shown) by microphone in fig. 3 (3)); and removing acoustic noise from at least one of the acoustic signals by applying the first transfer function(noise transfer function) and at least one combination (1) of the first transfer function(noise transfer function) and the second transfer function(speech transfer function) to the acoustic signals and generating denoised acoustic signals(103) (see fig.3 (col.2 line 40-col. 3 line 33).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Hosoi into Silverberg to produce more accurate to reducing the noise.

Consider claims 2-3 Silverberg teaches removing noise further comprises: generating transfer function of the at least two transfer functions to be representative of a ratio of energy of the acoustic signal received when the VAD indicates that user voice activity is present; and removing noise from the acoustic signals using at least one combination of the at least function two transfer functions and the at least one second transfer function to generate the denoised acoustic signals(see fig.1 and col. 2 line 15-68); and the of acoustic signals include at least one reflection inherently (because, the noise and desired signal bounds around the first and second microphone) of at least one associated noise source signal and at least one reflection of at least one acoustic source signal(see fig. 1 and col. 2 line 15-68).

Consider claims 6 and 8 Silverberg teaches generating the at least function two transfer functions comprises recalculating the at least one two transfer functions during at least one prespecified interval (see fig. 1 and col. 2 line 15-col. 3 line 24); and generating the at least function two transfer functions comprises use of at least one technique selected from a group consisting of adaptive techniques and recursive techniques (see fig. 1 and col. 2 line 15-col. 3 line 24).

Consider claims 9-11, Silverberg as modified by Holzrichter teaches that the method of information on the vibration of human tissue is provided by a sensor (in Holzrichter such as, motion sensor) in contact with the skin (in Holzrichter see figs 3a-3b(29,30,33)) and see col. 14 line 46-col. 15 line 18); and the method of information on the vibration of human tissue is provided via at least one sensor selected from among at least one of an accelerometer, a skin surface microphone in physical contact with skin of a user, a human tissue vibration detector, a radio frequency (R.F) vibration detector, and a laser vibration detector(in Holzrichter see figs 3a-3b(29,30,33) and see col. 14 line 46-col. 15 line 18); and the human tissue is at least one of on a surface of a head, near the surface of the head, on a surface of a neck, near the surface of the neck, on a surface of a chest, and near the surface of the chest (in Holzrichter see figs 3a-3b(29,30,33)) and see col. 14 line 46-col. 15 line 18).

Consider claim 26, Silverberg teaches a system for removing acoustic noise from the acoustic signals, comprising:

a receiver that receives at least two acoustic signals via at least two acoustic microphones positioned in a plurality of locations (see fig.1 (10, 11));

a processor coupled among the receiver (see fig.1 and col. 3 line 39) and the at least one sensor that generates a plurality of transfer functions(12,13), wherein the plurality of transfer functions includes a first transfer function representative of a ratio of energy of acoustic signals received using at least two different acoustic microphones(10,11) of the at least two acoustic microphones (10,11), wherein the first transfer function is generated in response to a determination that voicing activity is absent from the acoustic signals for a period of time, wherein the plurality of transfer functions includes a second transfer function representative of the acoustic signals, wherein the second transfer function is generated in response to a determination that voicing activity is present in the acoustic signals for the period of time, wherein acoustic noise is removed from the acoustic signals using on of the first transfer function and at least one combination of the first transfer function and the second transfer function to produce the denoised acoustic data stream(see figs 1-2 and col. 2 line 15-col. 3 line 68); but Silverberg does not explicitly teach receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user; and acoustic noise is removed from the acoustic signals using the first transfer function and at least one combination of the first transfer function and the second transfer function to produce the denoised acoustic data stream.

However, Holzrichter teaches receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user(see fig. 5 (43) and see col. 15 line 29-col. 16 line 3 and col. 60 line 19-30); and acoustic noise is removed from the acoustic signals using the first transfer function(57 in

fig. 5) and at least one combination(59) of the first transfer function(57) and the second transfer function(56) to produce the denoised acoustic data stream(59 and see col. 15 line 29-col. 16 line 3).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Holizrichter into Silverberg to produce more accurate speech coding.

On the other hand, Hosoi teaches that acoustic noise is removed from the acoustic signals using the first transfer function(picks up a noise transfer function (no shown) by microphone in fig.3 (2)) and at least one combination (see fig.3 (1)) of the first transfer function(such as noise transfer function) and the second transfer function(picks up another speech transfer function (no shown) by microphone in fig. 3 (3)) to produce the denoised acoustic data stream (103)(see fig.3 (col.2 line 40-col. 3 line 33).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Hosoi into Silverberg to produce more accurate to reducing the noise.

Consider claim 28 Silverberg as modified by Holzrichter teaches that the sensor includes a mechanical sensor (such as, motion sensor) in contact with the skin (In Holzrichter see figs 3a-3b(29,30,33)) and see col. 14 line 46-col. 15 line 18);

Consider claim 29 Silverberg as modified by Holzrichter teaches at least one sensor selected from among at least one of an accelerometer, a skin surface microphone in physical contact with skin of a user, a human tissue vibration detector, a radio frequency

(R.F) vibration detector, and a laser vibration detector (in Holzrichter, see figs 3a-3b (29, 30, 33) and see col. 14 line 46-col. 15 line 18);

Consider claim 30 Silverberg as modified by Holzrichter teaches at least one of on a surface of a head, near the surface of the head, on a surface of a neck, near the surface of the neck, on a surface of a chest, and near the surface of the chest (In Holzrichter see figs 3a-3b (29, 30, 33)) and see col. 14 line 46-col. 15 line 18).

Consider claims 38 and 41, they are essentially similar to claim 30 and are rejected for the reason stated above apropos to claim 30.

Consider claim 32 Silverberg teaches the system wherein the receiver includes a plurality of independently located microphones (see fig.1 (10, 11)).

Consider claim 35, Silverberg teaches a signal processing system coupled among a user and an electronic device (see fig.1), wherein the signal processing system includes a denoising subsystem for removing acoustic noise from acoustic signals, the denoising subsystem comprising a processor(see fig.1 and col. 3 line 3-9) coupled among a receiver (10,11)and at least one sensor, wherein the receiver is coupled to receive the acoustic signals via at least two microphones(10,11), wherein the processor generates a plurality of transfer functions(12,13), wherein a first transfer function representative of a ratio of acoustic energy received by the two microphones(10,11) is generated in response to a determination that voicing activity is absent from the acoustic signals for a specified period of time, wherein second transfer function representative of the acoustic signals is generated in response to a determination that voicing activity is present in the acoustic signals for a specified period of time, wherein

acoustic noise is removed from the acoustic signals using one of the first transfer function and at least one combination of the first transfer function and the second transfer function to produce a denoised acoustic data stream(see figs 1-2 and col. 2 line 15-col. 3 line 68); but Silverberg does not explicitly teach the at least one sensor detects human tissue vibration associated with human voicing activity of a user; and acoustic noise is removed from the acoustic signals using the first transfer function and at least one combination of the first transfer function and the second transfer function to produce the denoised acoustic data stream.

However, Holzrichter teaches the at least one sensor detects human tissue vibration associated with human voicing activity of a user (see fig. 5 (43) and see col. 15 line 29-col. 16 line 3 and col. 60 line 19-30); and acoustic noise is removed from the acoustic signals using the first transfer function(57 in fig. 5) and at least one combination(59) of the first transfer function(57) and the second transfer function(56) to produce the denoised acoustic data stream(59 and see col. 15 line 29-col. 16 line 3).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Holizrichter into Silverberg to produce more accurate speech coding.

On the other hand, Hosoi teaches that acoustic noise is removed from the acoustic signals using the first transfer function(picks up a noise transfer function(no shown) by microphone in fig.3 (2)) and at least one combination(see fig.3 (1)) of the first transfer function(such as noise transfer function) and the second transfer function(picks up

another speech transfer function (no shown) by microphone in fig. 3 (3)) to produce the denoised acoustic data stream (103)(see fig.3 (col.2 line 40-col. 3 line 33).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Hosoi into Silverberg to produce more accurate to reducing the noise.

Consider claim 37, Silverberg as modified by Holzrichter teaches that the system of the at least one electronic device includes at least one of cellular telephones, personal digital assistants, portable communication devices, computers, video cameras, digital cameras, and telematics systems (in Holzrichter, see col. 16 line 51-67).

4. Claims 31 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverberg et al (US PAT. 5,406,622) as modified by Holzrichter (US PAT. 5,729,694) and Hosoi (US PAT. 5,754,665) as applied to claims 1 and 26 above, and further in view of Cezanne et al. (US PAT. 5,473,701).

Consider claim 31, Silverberg as modified by Holzrichter does not explicitly teach the system further comprising: dividing acoustic data of the acoustic signals into a plurality of subbands; generating a transfer function representative of the ratio of acoustic energies received in each microphone in each subband; removing acoustic noise from each of the plurality of subbands using a transfer function, wherein a plurality of denoised acoustic data streams are generated; and combining the plurality of denoised acoustic data streams to generate the at denoised acoustic data stream.

However, Cezanne teaches the system further comprising:

dividing acoustic data of the acoustic signals into a plurality of subbands (see fig. 3, fig. 7); generating a transfer function representative of the ratio of acoustic energies received in each microphone in each subband (see abstract);

removing acoustic noise from each of the plurality of subbands using a transfer function, wherein a plurality of denoised acoustic data streams are generated; and combining the plurality of denoised acoustic data streams to generate the at denoised acoustic data stream (see col. 5 line 35-col. 6 line 50 and col.7 line 46-col.8 line 23).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Cezanne into the teaching of Holizrichter and Silverberg to provide a desirable level of noise rejection, they may be of limited usefulness in situations where noise sources move in relation to the array.

Consider claim 45 it is essentially similar to claim 31 and are rejected for the reason stated above apropos to claim 31.

5. Claims 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverberg et al (US PAT. 5,406,622) as modified by Holzrichter (US PAT. 5,729,694) and Hosoi (US PAT. 5,754,665) as applied to claims 1 and 26 above, and further in view of Bradley et al. (US PAT. 5,463,694).

Consider claim 47, Silverberg as modified by Holzrichter and Hosoi does not explicitly teach the at least two acoustic microphones comprise a first directional acoustic microphone and a second directional acoustic microphone, wherein the first directional

acoustic microphone and the second directional acoustic microphone selectively attenuate the acoustic signals based on the direction of arrival.

However, Bradley teaches the at least two acoustic microphones comprise a first directional acoustic microphone and a second directional acoustic microphone, wherein the first directional acoustic microphone and the second directional acoustic microphone selectively attenuate the acoustic signals based on the direction of arrival (see figs. 1-4 and col. 3 line 33-col. 4 line 68).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the unidirectional microphone array of Bradley in the invention of Silverberg.

The motivation for doing so would have been to reduce the size and complexity of the microphone system of Silverberg as taught by Bradley (co1.2 In.48-52).

Consider claim 49, it is essentially similar to claim 47and is rejected for the reason stated above apropos to claim 47.

Response to Arguments

6. Applicant's arguments filed 06-24-2010 have been fully considered but they are not persuasive.

Applicant argued that Holzrichter does not disclose at least two transfer functions that comprise a first transfer function and a second transfer function and, as such, does not overcome the deficiencies of Silverberg in making claim 1 unpatentable. Consequently, the combination of Silverberg in view of Holzrichter fails to disclose

removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. For at least these reasons, Applicant respectfully submits that amended claim 1 is patentable over Silverberg in view of Holzrichter (see the remarks page 12, 2nd and 3rd paragraphs).

The examiner disagrees respectfully. Holzrichter discloses a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user(see fig. 5 (43) and see col. 15 line 29-col. 16 line 3 and col. 60 line 19-30); and the at least two transfer functions comprise a first transfer function (see fig. 5(57)) and a second transfer function (56); and removing acoustic noise from at least one of the acoustic signals by applying the first transfer function (57) and at least one combination (58) of the first transfer function (57) and the second transfer function (56) to the acoustic signals and generating denoised acoustic signals (59) (see col. 15 line 29-col. 16 line 3). The combination meets the limitation as recited in claim 1.

Applicant further argued that Hosoi does not describe at least two transfer functions that comprise a first transfer function and a second transfer function, Hosoi does not describe removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals (see the remarks page 14 2nd paragraph).

The examiner disagrees respectfully. Hosoi discloses a first transfer function (picks up a noise transfer function(not shown) by microphone in fig.3 (2)) and a second transfer function (picks up another speech transfer function(not shown) by microphone in fig. 3 (3)); and removing acoustic noise from at least one of the acoustic signals by applying the first transfer function(noise transfer function) and at least one combination (1) of the first transfer function(noise transfer function) and the second transfer function(speech transfer function) to the acoustic signals and generating denoised acoustic signals(103) (see fig.3 (col.2 line 40-col. 3 line 33). The combination meets the limitation as recited in claim 1.

As claims 2, 3, 6, 8-11, 28-32, 37, 38, 45, 47 and 49 depend from independent claims 1, 26 and 35 and include limitations thereon, and since independent claims 1, 26 and 35 are rejected over Silverberg in view of Holzrichter and Hosoi, claims 2, 3, 6, 8-11, 45, and 47 are rejected over Silverberg in view of Holzrichter and Hosoi by the examiner above.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. The prior art made of record and not relied upon is considered to applicant's disclosure. Kanamori et al. (US PAT. 5,633,935) is recited to show other related the voice activity detector (VAD) based multiple-microphone acoustic noise suppression.

9. Any response to this action should be mailed to:

Mail Stop ____(explanation, e.g., Amendment or After-final, etc.)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Facsimile responses should be faxed to:
(571) 273-8300

Hand-delivered responses should be brought to:
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (571) 272-7501 The examiner can normally be reached on Monday-Friday from 8:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin, can be reached on (571) 272-7848.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the Technology Center 2600 whose telephone number is (571) 272-2600.

Lao,Lun-See
/LUN-SEE LAO/
Examiner, Art Unit 2614
Patent Examiner
US Patent and Trademark Office
Knox
571-272-7501
Date 08-23-2010

/Xu Mei/
Primary Examiner, Art Unit 2614